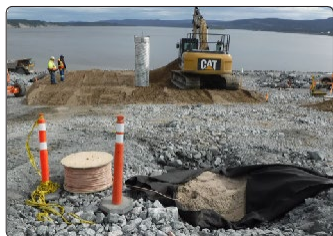


Muskrat Falls – North Spur, Labrador



◆ Standpipe piezometer protection construction



◆ Vibrating wire piezometer surge protector



◆ Cable trench



◆ Automatic data acquisition system



Muskrat Falls – North Spur, downstream view

The Muskrat Falls project, led by Nalcor Energy, consists in the construction of an 824-megawatt (MW) hydroelectric dam on the lower Churchill River in Labrador. Specifically, GKM Consultants was appointed to the North Spur section, a natural barrier that has been reinforced to hold back the rise in water level. Long-term monitoring of this key section is essential to ensure safe operation of the reservoir. GKM scope of work included supply and installation of vibrating wire piezometers and inclinometers, cable routing design and assistance, implementation of an automatic monitoring system, and complete training and handover to client.

Before its reinforcement, the North Spur was subject to landslides. To monitor ground movement during and after its completion, we installed inclinometer casings in different locations. On-site specialized training on the functionalities of the Geokon GK-404 digital inclinometer system was also provided to Nalcor's personnel.

As the reservoir water level rises, hydraulic overpressure can possibly cause ground instability. Thus, a total of 40 vibrating wire piezometers were installed in existing and

new standpipes to oversee water pressure along the dam. All the piezometers were connected to a Geokon Model 4999-12L/E LAB3 Surge Protection Board to minimize risk of damage in case of electric overload caused by lightning. At that part, one of the challenge was routing, through the active construction site, kilometers of piezometer communication cables to reach one single point, the automatic data acquisition system. The automatic monitoring system is collecting in real-time all piezometers data and relayed them directly on client server via Ethernet connection. This design provided an easy and simple way for the client to receive and analyse the required information.

GKM Consultants is proud to assist the Government of Newfoundland and Labrador in their ambition to develop a major source of renewable and sustainable energy.